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Tailoring functional properties of Zr-V thin films by competitive self-separation of crystalline and amorphous phases during sputtering

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☒ Oral presentation ☐ Poster presentation

ABSTRACT

Competitive self-separation of crystalline and amorphous phases has been reported for Zr-based binary alloys during thin film deposition[1],[2]. This allows the possibility to control surface topography and thus, surface-related properties. Zr-V thin films were synthesized by magnetron co-sputtering of Zr and V targets. This process allows to synthesize Zr-V thin films with a competitive growth between the amorphous and crystalline phases, showing both phases: the amorphous columns, and crystalline cones (Fig. 1). Thus, increasing the thickness increases the surface coverage by the crystalline phase, changing the surface roughness and functional properties of the films. This study focuses on increasing the antibacterial properties of surfaces, by coating the aforementioned Zr-V films with a 65nm-thick Cu layer. It is shown that this process increases the antibacterial properties of the films as compared to a flat surface.

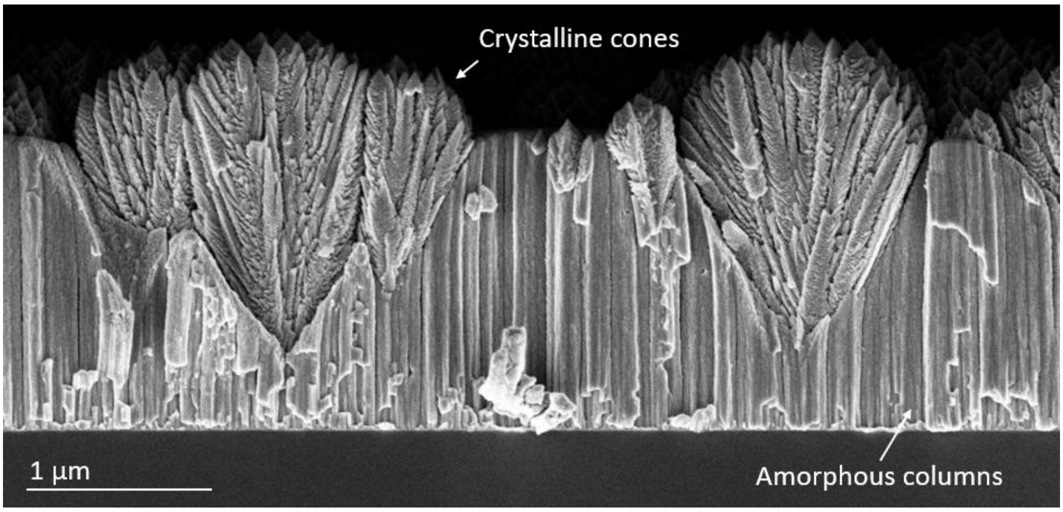

Fig. 1: Cross-section SEM micrograph showing a Zr-V thin film with amorphous columns and crystalline cones.

[1] A. Borroto, A.C. García-Wong, S. Bruyère, S. Migot, D. Pilloud, J.F. Pierson, F. Mücklich, and D. Horwat, Applied Surface Science **538**, 148133 (2021).

[2] A. Borroto, S. Bruyère, S. Migot, J.F. Pierson, T. Gries, F. Mücklich, and D. Horwat, Acta Materialia **181**, 78 (2019).